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User Experience Design and Digital Nudging in a Decision Making Process

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Abstract When using online nudges to steer people in the right direction while they are making a decision, there is usually one preferable outcome. What might happen if the user experience is inadequate, will the nudges still work or might they be undermined? In this paper we investigate the correlation between user experience and digital nudges in a decision making process. A user A/B test was conducted to investigate the problem. The test participants visited one of two websites that included the same nudges where they were nudged to choose option (a) instead of (b). The only difference in the websites was the quality of the user experience, one website design had a good user experience while the other one offered an inadequate user experience. The results showed that everyone who was assigned the good user experience chose (a), while two of the inadequate experience participants chose (b). The results indicate that user experience design can be used for digital nudging.

Keywords: • Digital Nudging • User Experience • Decision Making Process • Decision • User •

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1 Introduction

Every day, people make choices, good ones that support their long-term goals, and sometimes they make bad ones that go against their ethical values. Daily they scroll on their smartphones, and computers, and experience the digital content of their favorite applications and services unaware of what is being presented to them, is not neutral (Thaler & Sunstein, 2008). Companies build applications that provide wonderful user experience (UX) that will make the users stay longer on their page. When the users are about to make a choice, they might be influenced, or nudged, by the user interface (UI) design to encourage the user to make a specific choice.

In simple terms, digital nudging is when the design elements of the UI guide the user through a choice environment resulting in the user's behavior being altered. A well-designed nudge should only guide the user to make the choice that is best for their interests (Thaler & Sunstein, 2008). Being nudged to a positive outcome means that the main goal should be that the user should benefit from the choice, not that the company should make profit at the user's expense. A good UX design on the other hand, creates a product or service that meets the user's need and makes them a joy to own or use (Norman & Nielsen, 2014).

Girling (2012, p. 4) states that, "you can give people all the facts and create the most informative, attractive communications materials, which may change people's attitudes towards something, but it is very unlikely to get them to change behavior". Furthermore, Girling (2012) encourages UX design for positive outcomes instead of just focusing on a wonderful UX design. But what happens if the designer, or choice architect, only thinks about the choice architecture and forgets about the UX? Will the users still choose what is best for them, or will the nudging be overshadowed or lost in poor design? How much will the UX actually influence the nudging?

The aim of this introductory study is to investigate how UX and digital nudging are correlated. The objective is to estimate how the UX, in terms of aesthetic and minimalist design, learnability, and efficiency, will affect the outcome in decision-making processes where the user is being nudged to a positive outcome. Two different scenarios will be designed where a user have to make a decision in a UI.

The scenarios being tested will be made with insights from well-recognized nudge theory and UX guidelines.

2 Theoretical Framework

To be able to draw conclusions from the objective of this paper, two different domains need to be considered. Firstly, what is UX and how can a service or product benefit from implementing a great user experience? Secondly, what is nudging and how does it work?

2.1 User Experience

When it comes to UX it is about so much more than just usability. An engaging and complete user experience involves the whole spectra of using a service or product. For example, this means that the emotions, needs, usability, utility and overall satisfaction an end-user has, all play a role in delivering the UX (Norman & Nielsen, 2014). There are many definitions of UX including that of Hassenzahl and Tractinsky (2006) who define UX as a consequence of three factors. First comes the user's internal state, meaning the predispositions, expectations, needs, motivation and mood. The second factor is the characteristics of the designed system, e.g. complexity, purpose, usability and functionality. The third factor is the contextual (or environmental) factor, within which the interaction occurs, e.g. organizational/social setting, meaningfulness of the activity and voluntariness of use. Norman & Nielsen (2014) define UX as all aspects of the end-user's interaction with the company, its services, and its products. Their first requirement of an excellent UX is that the exact needs of the user must be met, without fuss or bother. Second comes the fact that the product must carry elegance and simplicity that makes it a joy to own and use. As a concluding statement they affirm that the company's offerings must work seamlessly over multiple disciplines, including engineering, marketing, graphical and industrial design, and interface design.

Hassenzahl and Tractinsky's (2006) definition is more about what UX consists of, while Nielsen-Norman Group's definition is more about how to achieve good UX. In this paper, the research results will be discussed in relation to both of these two definitions with the results. Nonetheless, if you remove one of the parts mentioned in the above definitions, it will affect the overall experience.

Usability in the UX Spectrum. People constantly leave websites or applications without completing the purpose for which they engaged with the interface. A major reason for this is because of inadequate usability. Nielsen (2012) states that “if a website is difficult to use, people leave. If the homepage fails to clearly state what a company offers and what users can do on the site, people leave. If users get lost on a website, they leave. If a website’s information is hard to read or doesn’t answer users’ key questions, they leave”. This means that usability plays an important role in creating good UX. Without usability, the experience of the user will be disrupted. Usability is also a very broad domain that contains more than just the heuristics of aesthetic and minimalist design, learnability and efficiency. However, since these heuristics were altered in the test scenario, further explanation of them is needed.

- **Aesthetic and Minimalist Design** explains that information that is irrelevant or rarely needed should not clutter dialogues (Nielsen, 1995). This is because the irrelevant information will compete with the important and relevant units. The visibility of the important units will be diminished.
- **Learnability** is simply defined by how fast a user can perform a basic task the first time they encounter the design (Nielsen, 2012).
- **Efficiency** is defined by how quickly a user can perform a task once they have learned the design (Nielsen, 2012).

2.2 The Nudge Theory

Thaler and Sunstein (2008) define a nudge as any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives. The intervention must also be cheap and easy to avoid. An example given is the placing of fruit at eye level in a cafeteria, which counts as nudge, while banning junk food does not. However, humans do not make choices in a vacuum, that the choice is placed in a context where many features, noticed and unnoticed, may influence their decisions (Thaler, Sunstein & Balz, 2010). The ones creating these environments are the *choice architects*. They are the ones who can alter this environment by gently giving incentive, or nudge, people into making better choices. These nudges, should not be forcing a decision upon anyone, a philosophy they call *libertarian*

paternalism. Examples of nudges are automatic enrollment of a pension plan with an opt-out option compared to an opt-in, speed lines on the road, nutritional labels on food and putting an image of a fly in a urinal to improve aim and hence reduce spillage.

The nudge theory is derived from behavioral economics and political theory, but it can also be applied in the digital world. It is then often known as *digital nudge*. The difference is that the design elements of the UI will work as the tools to steer people in the right direction in the digital environment (Mirsch, Lehrer & Jung, 2017). There are many different ways to actually put digital nudging in use. Techniques a choice architect can use are *framing, status quo bias, social norms, loss aversion, anchoring and adjustment, hyperbolic discounting, decoupling, priming and availability heuristics* (Mirsch et al., 2017). In this research a combination of framing, loss aversion, social norms and priming was used in the test scenario.

Loss Aversion. Loss aversion is the simple mentality that it is harder to lose than it is to gain. The estimation is said that it is roughly twice as hard on people to lose something as it is to gain something with the same value (Thaler & Sunstein, 2008), people are “loss averse”. An example of this is the mug experiment (Kahneman, Knetsch & Thaler, 1991). In a class of students, half of them were given a coffee mug. The mug owners could sell their mug after the non-mug owners had examined it. The results showed that those with mugs demanded roughly twice as much to give up their mug as to the non-owners were willing to pay to purchase one. A conclusion to draw from this is “once I have a mug, I don’t want to give it up. But if I don’t have one, I don’t feel an urgent need to buy one”.

Framing. Framing is basically how you choose to present a decision. Thaler and Sunstein (2008) give a great example of this. Consider the two options: (a) If you use energy conservation methods, you will save \$350 per year; (b) If you do not use energy conservation methods, you will lose \$350 per year. Framed in terms of losses, option (b) is a significantly better nudge if a government wants to encourage energy conservation. This is framing used loss aversion and it works because people tend to be fairly mindless, passive decision makers.

Social Norms. Social Norms can also be described as the “herd mentality”, or following the herd. This means that users do what is accepted by the society, or what everyone else is doing. There are two reasons why the decisions of a user can be altered by social norms. One involves the fear of disapproval of the group, i.e. peer pressure. The other one involves information brought by other people’s answers (Thaler & Sunstein, 2008). An example of the latter is the tax compliance experiment in Minnesota (Coleman, 1996). Taxpayers were told one out of four things. That the tax received by the government went towards public welfare. That they would be punished if they did not pay tax. That they could get help to pay tax. That 90 percent of Minnesota already complied to pay tax. Only the last statement had a significant effect. A digital example of the herd mentality is Amazon’s product recommendation system that shows “other people who bought this, also bought...” (Mirsch et al., 2017).

Priming. Priming has a lot to do with preparation and association before a decision. Studies have shown that people, who are asked about their intentions, are more likely to act on their answers (Thaler & Sunstein, 2008). For example, asking a person the day before the election if they intend to vote, will increase the probability of their voting by 25 percent.

3 Method

When investigating the correlation between UX and digital nudging, two different platform designs were created and the users had to make a decision in the assigned UI. The designs contained the same nudges. This meant that if the decision outcomes differed between the two designs, the connection between UX quality and response to nudges was high, and if the decision outcomes were the same between the designs, the connection was low.

3.1 Participants

Ten participants performed the test. Half of them were assigned design (a) and half of them design (b). The participants were students who were randomly asked in the corridor at Umeå University if they wanted to participate and no incentive was provided for them to participate. The reason for choosing students on campus is because they are used to being involved in these kind of tests and would not be stressed or inconvenienced by participating. Therefore the results

would not be compromised by having the priming effect of “having to perform good results”. Half of the participants identified as female and the rest as male. Two of the male participants and three of the females got the inadequate UX design. Hence, the distribution was almost similar. The age span of the participants was quite narrow with 70 percent were between 18-24 years old, while the rest were between 25-29 years old. All tests were performed during spring 2018.

3.2 Design

The experiment used an A/B testing design (sometimes called split testing) (Kohavi & Thomke, 2017). This meant that the two different designs were pitted against each other. In this case the participant was visiting a website, either with design (a) or design (b). Both of the UI designs contained the same nudges, but the UX was inadequate in (a) whereas (b) had the recognized UX guidelines. As mentioned in the objective, some of the usability factors were modified in (a), specifically aesthetic and minimalist design, learnability and efficiency. The reason for only modifying these factors was that if more factors of the UX were made inadequate, the premise was that the UX would be too deficient.

In order to produce similar mindsets with the participants, they were assigned a very specific scenario. The scenario read: “You are building a house and need to provide your house with electricity and therefore install sockets. You have two different socket types you can choose between. Just browse through the options really quickly and then make a decision by order your preferred socket type on the website”. The participant could choose between a normal socket type or a new type of socket (the Plug) that conserved energy. The Plug would cost a bit more to install but would in the long term save the buyer money. The Plug would also be environmentally friendly. Hence, in the long term, the Plug would be the best choice in both economically and in environmentally aspects.

The nudges were taken from a mix of priming, framing, loss aversion and social norms. The first nudge was asking if the buyer thought about the environment: *Do you intend to be environmentally friendly?* This was the priming nudge. The next nudge was playing on framing combined with loss aversion: *You will lose \$ 350 per year if you do not use the energy saving Plug.* The last nudge was playing on social norms: *2017, 90 percent of house builders have installed the Plug.*

3.3 Materials

As mentioned before, two websites with different designs was used together and ended with a Google forms survey.

Design (a) - Inadequate UX. The inadequate UX design had confusing navigation, repeated text and a cluttered design that failed to point out the most important parts of the choice process. The information text that is shown on the first page (figure 1), is exactly the same on the pages of “Normal sockets”, “The Plug” and “Sockets”, which aimed to wear out the user reading the same content over and over. The content can be better read in figure 4. The navigation menu that can be seen in figure 1 aimed to confuse the user as to where the actual order page were, figure 2 shows the order page. Even though all the pages could be displayed in the blue bar, the options were slightly hidden by putting them behind the three dots. Lastly, the reason to split up the pages even though the information was the same, was to try and wear out the user by clicking around on the website without finding any useful information.

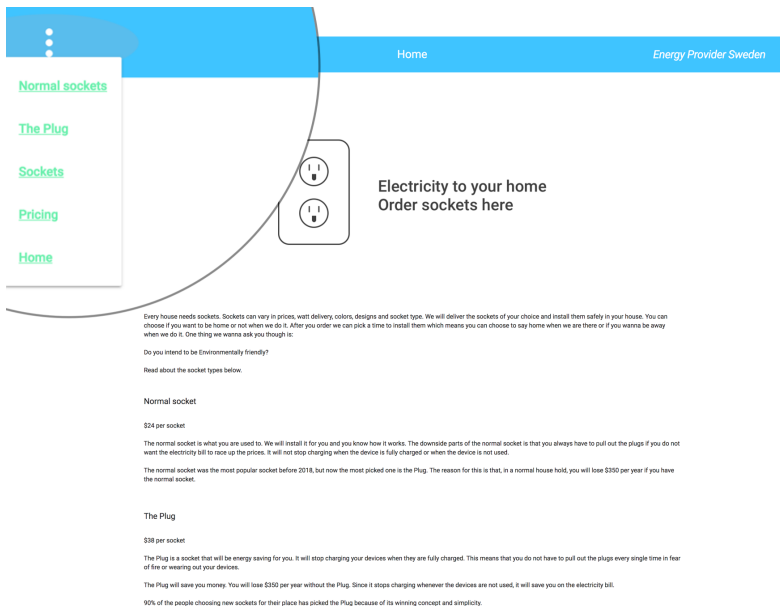


Figure 1: Inadequate UX: Home page displaying the navigation menu zoomed in.

⋮ Pricing Energy Provider Sweden

Order

☐ Normal Socket (\$24 per socket)

☐ The Plug (\$38 per socket)

Lay order

Figure 2: Inadequate UX: Pricing and order page.

The nudges were subtly located in the text. The priming nudge was located in the first paragraph on the home page. The framing nudge playing on loss aversion was located in the second paragraph under the title “Normal sockets” and the nudge playing on social norms was located in the last paragraph under the title “The Plug”.

Design (b) - Good UX. The design that had a better UX was a single page website that was more straightforward to use (figure 3). The first thing the user met in the design, was the priming nudge asking if the user intended to be environmentally friendly. Next up came the two other nudges that played on framing, loss aversion and social norms.

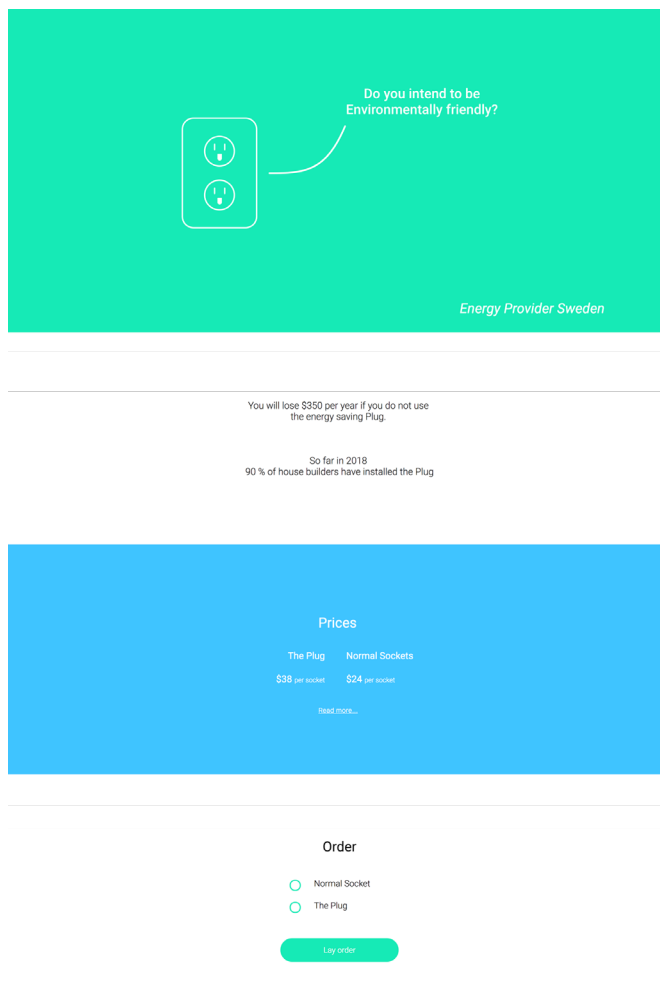


Figure 3: Good UX: Single page showing the good UX alternative.

Right after that came the prices for the two different sockets. Lastly came the order section. If the user wanted to know more about the different sockets, he or she could expand the pricing section to read more about the options (figure 4). The text that was displayed in the expanded section was the same text that could be found in the inadequate design. The aim was to make an intuitive design that pointed out the most important parts as well as making the navigation simple and natural.

Prices

The Plug	Normal Sockets
\$38 per socket	\$24 per socket
<p>The Plug is a socket that will be energy saving for you. It will stop charging your devices when they are fully charged. This means that you do not have to pull out the plugs every single time in fear of fire or wearing out your devices.</p> <p>The Plug will save you money. You will lose \$350 per year without the Plug. Since it stops charging whenever the devices are not used, it will save you on the electricity bill.</p> <p>90% of the people choosing new sockets for their place has picked the Plug because of its winning concept and simplicity.</p>	<p>The normal socket is what you are used to. We will install it for you and you know how it works.</p> <p>The downside parts of the normal socket is that you always have to pull out the plugs if you do not want the electricity bill to race up the prices. It will not stop charging when the device is fully charged or when the device is not used.</p> <p>The normal socket was the most popular socket before 2018, but now the most picked one is the Plug. The reason for this is that, in a normal house hold, you will lose \$350 per year if you have the normal socket.</p>

Every house needs sockets. Sockets can vary in prices, watt delivery, colors, designs and socket type. We will deliver the sockets of your choice and install them safely in your house. You can choose if you want to be home or not when we do it. After you order we can pick a time to install them which means you can choose to say home when we are there or if you wanna be away when we do it.

[Read less...](#)

Figure 4: Good UX: Pricing information expanded.

3.4 Procedure

An examiner went through the test with the participant, one-on-one, during an average of a five minutes long session. The examiner explained the scenario to the participant and then introduced the website. The participant was then told to look through their options on the website before making a decision in the UI. After the decision was made, the examiner told the participant to fill in a Google Form survey with questions regarding basic characteristics (sex and age), why they chose the way they did and how the UX of the website felt like.

By looking at the final decision outcomes, an estimation was made to investigate the correlation between these two theories. The suggestion was that if the outcomes were the same in both designs, then UX and digital nudging were closely correlated. If the final outcomes varied a lot in the different designs, then UX and digital nudging were not closely correlated.

4 Results

The results show that when exposed to the inadequate design 60% chose the Plug and 40% the normal while among the participants exposed to the good UX design 100% chose the Plug. The reasons why the participants chose the Plug varied, some had multiple reasons and some had only one reason. The reasons and how of the many participants had them can be seen in figure 5. As for the participants that chose the normal socket, one reason was out of fear for the new Plug. One participant said that “the normal socket is safer because I know how it works. There was too little information about the Plug, therefore I did not trust it enough to buy it”. The other participant that chose the normal socket as they did not really seem to read enough information about the options. The participant chose what sounded like a socket the most and since no sufficient information was read, the normal socket became the choice.

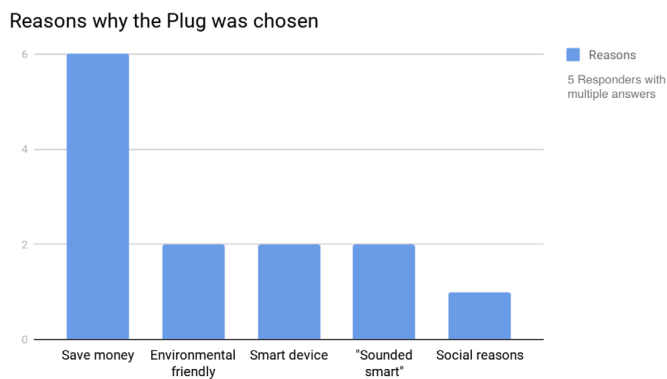


Figure 5: Reasons for choosing the Plug.

A summary of what the participants thought of the inadequate UX was that they:

- Did not like the dotted menu. It looked okay but it was confusing to guess if what you wanted to find might be there or not.
- Found it hard to understand how to add something as an order. They would have wanted to have an “add item” button in the same place as the product information.
- Found it hard to understand on what page they were going to order the sockets.
- Did like the colors.

A summary of what the participants thought of the good UX was that they:

- Thought it was very easy to navigate and find information as there were not too much distraction everywhere.
- Found the website quite trustworthy as it gave reasons and facts to why the plug was better.
- Thought it was intuitive and pleasing to the eye.
- Was confused that the Plug was on the left whole time but at the bottom on the radio button section.
- Had absolutely no difficulty in finding information. But when finding the expanded information, one participant said that he/she did not bother reading it because it was just a big wall of text.

By observing how the participants interacted with the websites, the decision came faster on the good UX website than the inadequate one. Also, the time to find the order section was significantly faster on the good UX website than the inadequate one where the participants navigated around a lot to find the right section.

5 Discussion

There are two matters in the materials used in the experiment that need to be highlighted before discussing the results. For (a) it was difficult to come up with a lot of text to fill the website. The design had to be as neutral as possible and not too informative in order to involuntarily prime or frame. Looking at the test

results and how the participant reacted while picking the preferred socket, the longer text may have been a little bit too biased, in favor of the Plug. It would have been better if the text was slightly more neutral. Secondly, by observing the participants scrolling and clicking around on the websites, it could be seen that the participants did read almost all of the text on both of the sites. The participants that got the good UX website that seemed to decide faster on their option. This estimation was done by observation. A timer should have been used to see the actual time differences on deciding on their option and finding the order section.

Despite that, by reviewing the comments of the overall UX, time to decide and time to find the order section, one thing became clear. The design that was supposed to be good, actually was good, and the design that was supposed to be inadequate, actually was inadequate. This is also supported by Hassenzahl and Tractinsky (2006) since, as previously described, *the complexity, purpose, usability and functionality is vital for constructing a good UX*. The increased complexity of the navigation and disruption of the usability in the inadequate UX website supports this statement, as well as the efficiency and comments by the good UX participants. The same goes for the statements from Nielsen Norman Group (Norman & Nielsen, 2014) that *the product must carry elegance and simplicity that makes it a joy to own and use*. Just by looking at the comments from the participants from both groups, you can see the aesthetic and minimalist design was playing a role in how the participants experienced the website.

What is harder to affirm is to what extent the nudges played a role. By looking at the reasons why the participant chose the way they did, we can see in figure 5 that a lot of their answers contained the planted nudges (environmental i.e. priming, social i.e. social norm and economical i.e. framing loss aversion). This means that the nudges probably came through in a predicted way, but there is still always a chance that the participant chooses to ignore the nudge, meaning you do not know if they just ignored the nudge or did not see the nudge at all. More participants should have been tested in order to get a more definitive result. Still, because of the final outcomes, there is an indication that the nudges actually worked. The top reason for choosing the Plug was for the economical reason i.e. framing loss aversion. This, the social reason and the environmental reason, confirms that the nudges at least affected the participants' contemplation to some extent. It would have been interesting to see what would have happened if the

normal socket and the Plug changed nudges. This could have confirmed that the nudges worked even better.

We know from the theory that nudges work, it has been tested in multiple studies. From the way nudges in the test scenario was formulated in such a good way that they at least changed some behavior in the participants. This means that a good UX, inadequate UX and good nudges (a requirement for this study) were created, even though some factors could have been more finely tuned. Nonetheless, the strongly favored option was the Plug, as all of the participants that had the good UX website and three of the participants that had the inadequate UX website chose this option. Only one participant that chose the normal socket did that for the justifiable reason that it felt safer to buy something when you know how it works. The other participant that chose the normal socket did not really seem to read about the Plug, and therefore might have missed the nudges all together. What still is interesting is that there actually was a difference in the final decision outcomes. The outcomes from the good UX website was exclusively the Plug, while it was not for the inadequate UX website, which is utterly interesting.

6 Conclusions

Only participants that had the inadequate UX website chose the normal socket, none of the participants that got the good UX website chose this option. The premise was that if the final decision outcomes differ, the correlation was high, i.e. the participants that got the good UX website chose the Plug and the participants that got the inadequate UX chose the normal socket. Because of the differences in the decision outcomes, this points to a correlation. It is not definitive, but it warrants further investigation.

Another interesting conclusion worth considering while designing with digital nudges, is the following. One participant that chose the normal socket expressed the feeling of tiredness while reading about the options. This resulted in her not even noticing the nudges by the result of inadequate minimalist design. This meant that the nudges in a way got affected, and invisible, that they did not even matter. As said before, this does not point to a correlation by itself, as the nudges was not read, but it stresses the importance of having a good UX in order increase visibility and to expose the nudges to the user.

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